"Energy Security and Producer – Consumer Dialogue: Avoiding a Maginot Mentality"

Robert Skinner
Director, Oxford Institute for Energy Studies
Oxford , U.K.

Background Paper

for

Government of Canada Energy Symposium

Energizing Supply: Oil and gas Investment in Uncertain Times

October 28th, 2005

Sheraton Hotel, Ottawa, Canada

Background Note
"Energy Security and Producer – Consumer Dialogue: Avoiding a Maginot Mentality"
Robert Skinner[1]
October 28th, 2005

Introduction

The Maginot Line of defensive fortifications in north-eastern France, built in the aftermath of WW I, has come to be a metaphor for blunder in government planning. For Mr Maginot, a highly respected civil servant, politician and statesman of early 20th C France, this is unfair. The line worked: it was not breached—just circumvented. However, the project is if anything a symbol of something very human—we are conditioned as a species to prepare for the next crisis by getting ready for the last. When it comes to energy security, looking at today's tight market through the lens of previous price shocks could lead to serious misunderstandings and policy errors.

The subject of security of energy supply has a long, rich and complicated history. It is again top on the public policy agenda and we can expect a flood of books on the subject[2]. It is the focus of virtually every international economic institution from the G8 down. They unanimously call for dialogue between producers and consumers as a means to 'market stability', an implied condition for security of oil supply. Should we be reassured or concerned? This note reviews and summarizes facets of this enduring theme in the political economy of energy and offers the following propositions:

1. Energy security has been the pretext for much bad policy: while we need to understand the past, we must avoid becoming its prisoner. New approaches are needed.
2. Economic, geopolitical and technical forces shape the context for energy supply: policies to secure it should be designed accordingly, including in the context of international dialogue.
3. The current price shock has very deep roots mostly related to a lack of investment: governments need to take great care in designing policies aimed at influencing investment.
4. Better information on the oil market is needed, but it does not follow that our understanding of the market will necessarily be improved as a result.

Security of Supply

Security of supply is a fundamental pursuit underlying biological survival. While that might seem a rather yeasty claim for something that has become almost banal, we should note that defining food security is a serious matter for the UN's FAO and its national counterparts because a clear definition frames the policies and programs they

---

[1] The views expressed in this paper are solely those of the author and do not represent the views of the Oxford Institute for Energy Studies or of its Members and Benefactors.

[2] See for example, J. H. Kalicki and D. L. Goldwyn, eds., 2005, *Energy & Security: Toward a New Foreign Policy Strategy*, Woodrow Wilson Center Press, Johns Hopkins Univ. Press. A collection of papers addressing the proposition that the United States' national security is negatively affected by its foreign policy and energy policy (or lack of) often being in conflict, and that a total rethink is therefore needed. Most discussions of 'energy security' tend to focus on security of *oil* supply.

promote. Not surprising, the same vocabulary appears in definitions of both food and energy security[3]. Food is just another word for energy, and getting enough of it on a steady and reliable basis has driven evolution for eons. Species that have evolved strategies to maximize their flexibility in sourcing food have tended to endure.

Energy security's banality is due in large measure to its having been so leveraged as a pretext for all manner of policy, from imperialism to isolationism, from expansionism to protectionism, from communism to economic liberalism: I have even encountered an argument that energy security would be greatly enhanced by the universal adherence to the vegan form of vegetarianism.

Mainstream government strategies to achieve energy supply security evolve as nations' preoccupations with different fuels shift in line with their importance to the economic and strategic goals of nations. There are many examples of governments seeing energy as an economic tool: nuclear power to Ontario's Premier Leslie Frost in the fifties; the '*Jobs Jobs Jobs'* chant of the Mulroney government in 1984; wind energy to Denmark. On the strategic front, the classic example was the early 1900s switch from cumbersome coal to convenient oil in navies. Supply had to be secured. In the imperial era this was achieved by simply annexing some other people's geography where oil was thought to exist. This practice came back to haunt the world in the seventies when the rightful owners reasserted their sovereign rights to these resources launching the modern preoccupation with oil security, and spawned a xenophobic policy jargon that included such economically nonsensical notions as energy independence, self-sufficiency and President Jimmy Carter's "Moral Equivalent of War".

However, the essential idea of what determines security of oil supply had been expressed by Winston Churchill in his often-quoted declaration: "On no one quality, on no one process, on no one country, on no one route, and on no one field must we be dependent. Safety and certainty in oil lie in variety and variety alone." Thus variety, or diversity, of supply, in fuels and their sources is more than anything else the essence of security of supply.

But there is another side to this coin, and that is security of demand for the producing countries, whose economies depend almost entirely on exporting oil and gas. More than three quarters of the world's hydrocarbon reserves are held by state-owned companies, sixty percent of oil that is exported comes from the OPEC producers, therefore international cooperation and a better understanding of the challenges these oil dependent producing countries face is in the self-interest of importing countries.

Energy Security through international cooperation: the IEA

Since the 1973 oil price spike, and the subsequent creation of the International Energy Agency by the rich, industrialized countries of the OECD, energy security has moved up and down their list of priorities. The IEA was created in the first instance to cooperate and share the burden of oil supply disruptions. The US was running down its own supply so it seemed a good idea to Henri Kissinger to share others' oil. In this

[3] See for example in, R. Skinner and R. Arnott; 2005, *The Oil Supply & Demand Context for Security of Oil Supply to the EU from the GCC Countries"*, for EU-GCC Dialogue, available as WPM 29 on www.oxfordenergy.org.

project, he found ready partners in Germany and Japan, essentially totally dependent on imported oil. The IEA's emergency oil sharing scheme was born[4].

By the time the emergency stock release and demand restraint system was first deployed, in 1991, it had to be totally revised as the structure of industry and markets had changed. But coordinated oil stock release was then seen as the first line of defence in the face of a supply disruption, although there was discrete communication with OPEC at the time.

Emergency stocks were not enough: IEA Ministers were convinced they also needed to cooperate on their energy policies, so on October 5th and 6th, 1977, meeting in Paris, they adopted the ***12 Principles for Energy Policy***. [Canada's Energy Minister, the Hon. Alastair Gillespie chaired the meeting. This is not irrelevant to the Principles' scope and focus for they reflect the same themes in Canada's domestic energy policies.]

Even though the Principles were drafted during a period of surplus capacity and relative calm in oil markets, IEA Ministers fervently believed that oil prices were not market-driven, but subject to a foreign cartel. Therefore as a counterbalance, non-market measures were justified in Ministers' minds. IEA member countries' energy policies were to be annually reviewed to see how well they lived up to these agreed principles. They were very dirigiste. To paraphrase:

1) Reduce oil demand.
2) Environmental and safety concerns, yes, but 'fast track' approvals[5].
3) Let prices go up to encourage conservation and alternatives (but note, not to world prices—the Canadian chairman had to defend Canada's two-price system for oil).
4) Promote and subsidize energy conservation and fuel substitution,
5) Progressive replacement of oil in power generation, district heating and industry,
6) Promote the use and trade of steam coal
7) Reserve gas for premium uses—not for power generation[6]
8) Expand nuclear "as a main and indispensable, element in attaining the group objectives…"
9) Spend more on energy R&D directed to near term impact, new fuels, renewables

---

[4] It is probably a good thing the IEA's Emergency Oil Sharing scheme as originally designed was never triggered. Under it, Canada as a net exporter, would have been placed in the domestically politically untenable position of requiring Canadians to exercise demand restraint while *increasing* oil exports to the U.S. For any Energy Minister to have had to explain that to the House of Commons would probably have been a career terminator.

[5] At the time the US had just received the first cargoes of crude from the recently completed Trans-Alaska Oil Pipeline System from Prudhoe Bay to Valdez. The Prudhoe Bay field was discovered in 1968. Native resistance delayed pipeline plans until claims were settled with a billion dollar payout, issuance of land and the establishment of native corporations. Concerned about growing oil import dependence, in November 1973 President Nixon signed the highly controversial Trans-Alaska Pipeline Authorization Act *"…to ensure that, because of …the national interest in early delivery of North Slope oil to domestic markets, the trans-Alaska oil pipeline be constructed promptly without further administrative or judicial delay or impediment.*"

[6] The U.S. Fuel Use Act and an EC directive did not permit building gas-fired power plants.

10) Provide a favourable investment climate, and increase flow of private and public capital to resource development, including incentives for exploration in offshore and frontier areas.
11) Develop plans to fill supply gaps—the head of the IEA at the time, even though surrounded by economists, was obsessed with supply 'gaps'
12) "Appropriate cooperation in energy" (this was code for dialogue with producers; "appropriate" was code for, *'Don't breach US anti-trust laws'* by talking about price). Two years later with prices rising again, referring to a key element in the International Energy Program (the treaty that created the IEA), Ministers expressed their willingness to discuss energy issues with oil-exporting countries; i.e., have a *Dialogue*[7]. They also urged the creation of "a better system for regular exchange of information on world energy demand and supply". Thus today's Producer – Consumer Dialogue and the Joint Oil Data Initiative (JODI) have roots nearly 3 decades old.

Incidentally, just to illustrate how some things never change, Ministers in 1977 welcomed the launch of new energy R&D agreements in:

- 500 KW solar electric power systems demonstration
- Extracting Energy from "Man-made" Geothermal Resources
- Testing superconducting magnets for Fusion Power Systems
- Experiments on Effects of Plasma on Wall Materials in Fusion Machines
- Hydrogen Production from Water
- Large scale Wind Power Demonstration
- Studies of Wind Power Applications and Environmental effects
- Low BTU Coal Gasification
- Refining Liquids Derived from Coal

If we follow the evolution of the IEA's statements since the seventies regarding energy security and the Agency's prescriptions for its achievement, the central theme of diversity of supply persists. Other priorities come and go.

- **1977 Energy Policy Principles**: As noted above, these were all about picking winners—coal, nuclear, "conservation"[8]—and designating losers—oil and the use of gas for power generation;
- **1993 Shared Goals**—a set of new, modern principles for policy in OECD countries, offered as a template for the new economies in transition[9] and other countries who were seeking policy guidance from the IEA for their post-communist economies; this was during a period of surplus supply capacity when governments were comfortable relying on market forces, and could make unchallenged claims that improved efficiency and renewable energy

[7] At the time most European members of the IEA along with France had established State-to-State oil purchasing agreements. Whether these bilateral deals had a 'beggar-thy-neighbour' effect and pre-empted multilateral discussions, or at least would have made them 'awkward', remains a subject for further study.
[8] The term, 'conservation', which connotes making do with less, later gave way in energy policy parlance to the economic concept of 'energy efficiency'—achieving the same or more with less.
[9] After the collapse of the Soviet Union, the IEA was besieged by delegations of energy officials from the new economies in transition and others (South Africa, South Korea) seeking advice on how to develop energy policies for pluralist economies that they aspired to become. All the IEA Secretariat had to offer (but didn't dare!) was the 1977 Principles, which resembled the sort of dicta these countries had just escaped. A new set of policy principles or goals had to be developed.

would simultaneously strengthen energy security and meet the new challenge of reducing greenhouse gas emissions, and do it at lower consumer prices in real terms, higher incomes and with energy less important in the consumer basket of goods.

Energy security was central among the Goals, although not dominant—the establishment of free and open market was seen as the fundamental point of departure; the encouragement of dialogue within a global context was seen as essential. The elements of energy security were set out in the Goals as follows:

- "Diversity, efficiency and flexibility within the energy sector are basic conditions for longer-term energy security; the fuels used within and across sectors and the sources of those fuels should be as diverse as practicable…
- Energy systems should have the ability to respond promptly and flexibly to energy emergencies. In some cases this requires collective mechanisms and action…
- Improved energy efficiency can promote both environmental protection and energy security…
- Continued research, development and market deployment of new and improved energy technologies (contribute to the objectives)…
- Undistorted energy prices enable markets to work efficiently…
- Free and open trade and a secure framework for investment contribute to efficient energy markets and energy security…
- Cooperation among all energy market participants helps to improve information and understanding…(and) to help promote the investment, trade and confidence necessary to achieve global energy security and environmental objectives." (International Energy Agency, Statement of Ministers, June 1993, IEA/OECD Paris.)

- **Y2K**—compelled IEA countries to consider system integrity and underscored the importance of technological preparedness at *home* rather than fearing political uncertainty abroad;
- **Post 9/11**—confirmed the terrorist threat to large energy supply systems;
- More recently, the Agency has pointed to its concerns about the growing share of internationally traded oil and gas that moves through critical **Choke Points;** subsequently it has cited **major power Blackouts,** the projected **Investment requirement,** and **Transparency of oil Reserves.** Its concern about future oil supply is behind its decision to focus its 2005 energy outlook special report on the Middle East and North African oil exporting countries.

This is not to question the Agency's changing emphasis—we should expect this of an international organization that must reflect the changing political priorities and preoccupations among its diverse membership, which are in turn influenced by the waxing and waning of the power and influence of elites and lobbies in capitals[10]. Our

[10] The United States has always been a key and dominant member of the IEA. Without the US, the institution would be largely irrelevant, yet the US sometimes requires the cooperation of other IEA members to provide 'air cover' for some of its policies and ventures. The recent supply of product from European countries' emergency stocks in the wake of Hurricane Katrina has perhaps made the co-dependence less asymmetrical.

perspective on energy security depends very much on where we stand and when. Context is everything.

Today, the 28th of October, is the 25th anniversary of the announcement of Canada's National Energy Program. It is so tempting for someone who was in the Department of Energy, Mines and Resources at the time to explore the parallels between then and today. There are some, but mostly the dreary recidivist rumbles of envy here in Central Canada of Alberta's oil and gas. I shall leave the NEP for others to dissect, apart from saying that it should never be forgotten as it is a classic example of how government intervention in the industrial sector tends to achieve inverse results from those intended.

The NEP was predicated, among other sentiments, on an anti-foreigner theme. It took only nine lines into his preface to the NEP for Minister Marc Lalonde to refer to "the caprice of an international oil cartel". Indeed, when we examine the history of energy policy in general and the pursuit of energy security, the theme of '*us and them'*, the *foreigners*, is constant. Today as Great Britain faces becoming a net importer of natural gas, we hear in the rhetoric of Whitehall the same anti-foreign fuel noises. But does viewing energy security in terms that imply mistrust a helpful starting point?

Middle East oil has long been perceived as unreliable. On the surface this is understandable given the political upheavals in the region. Yet, since the 1973 crisis, Gulf producers, principally Saudi Arabia, have supplied the market when production was interrupted in the region or somewhere else in the global supply system. Viewed globally the empirical record shows that most oil and gas supply interruptions did not involve foreign producers cutting off other countries' consumers. Far more frequently consumer countries have reduced supply through sanctions and boycotts against oil producers. Most supply interruptions have internal, domestic causes both political and technical. As a Canadian, the only people who have arbitrarily reduced my oil supply are fellow Canadians. In the UK and France, historically it has been industrial action by citizens that have cut off at different times the supply of coal, petrol, natural gas and electricity. Earlier this month, French unions blockaded oil ports and a major refinery in France—choosing to do so at a time of tight oil markets. Most other supply interruptions had technical causes, some of which reveal regulatory failure, lack of investment and cost cutting as contributory causes. Hurricanes Katrina and Rita have recently reminded us of this compellingly and tragically.

The current price shock, if we can call it that, is just one more sample in a rather limited set of oil price shocks over the last 35 years.

- **1973/74**: This shock is usually seen as political, triggered by the Yom Kippur War and the ensuing embargo of the US and the Netherlands by the OAPEC exporters. However it was also a demand-led shock: world demand had been growing since 1965 by 7.7% or 3.1 mb/d/year. Oil prices quadrupled over a quarter.
- **1979/80**: A politically driven shock, triggered by the Iranian revolution, followed by the invasion of Iran by Iraq, prices nearly tripled from $15 to over $40 then settled around $38 then eased to $34.
- **1985/86**: A counter shock when Saudi Arabia, in an increasingly oversupplied market, having cut back production to 2 mb/d in August 1985, decided to

restore its market share, triggering a price war. Prices plummeted by half to $10-12 and the international industry was left with much lower revenues and high costs.

- **1990/91**: Iraq invaded Kuwait removing 4.5 mb/d of supply, but quickly replaced by Saudi Arabia and others; a brief price spike to mid $30s then collapsed on January 17th invasion of Iraq by allied forces and the announcement of release of IEA stocks—while not actually taken up, it was the signal that counted and was registered in a price drop in markets. A politically driven crisis, but the management of industry inventories played a role in dampening the price effects as did the weakened state of OECD economies at the time.
- **1997/98**: Price collapsed to <$10 when in November, as the Asian Financial Crisis deepened, OPEC approved a production quota increase, which led to a price collapse. In part this was to discipline Venezuela and others for flooding the market. Of critical importance in 1998 was the cooperation from Non-OPEC countries Mexico, Yemen, Oman, Norway and (perhaps) Russia in reducing production —about 3 mb/d.
- **1999/2000**: OPEC announced further volume cuts; prices doubled but production levels were held, a clear sign of firming OPEC discipline aimed at keeping prices within its new $22 to $28 price band; quotas subsequently increased as prices rose to $32.
- **2001**: Price dropped, then rose after 9/11
- **Current rise**: Generally viewed as a demand-driven price increase mostly attributable to record world economic growth, led by China and the U.S., but the incremental growth in demand was not as much as in the years leading up to 1973. The current 'crisis' was compounded by the disappearance of OPEC spare capacity as it made up for politically triggered losses, disappointments and alerts in producing countries (Iraq, Venezuela, Nigeria, Norwegian strike, Saudi Arabia) and technical factors (Hurricane Ivan, refinery fires, upsets) with tight global refining capacity and a crude/product quality mis-match.

To say the current shock resembles 1973 risks oversimplifying. First of all, in 1973 75% of oil was consumed in the OECD region; nearly a quarter of the OECD's electricity was generated by oil versus less than 5% today; oil intensity in OECD economies was twice what it is today. The OECD currently accounts for less than 60% of world oil demand. The other 40% is consumed in countries where the demographic and income gearing leave little scope for believing demand will collapse as much as it did in the seventies. Finally, to suggest that 2005 resembles 1973 is to only see oil in political economy terms, and overlooks its fundamental scientific and technical underpinnings. In the early seventies petroleum geologists had just begun to look at resource potential through the brand new lens of Plate Tectonics and the bounty it offered particularly in the offshore environment. No equivalent new geological paradigm presents itself today.

Thus shocks differ in magnitude, causes, directions and consequences, and we need to take great care in concluding, 'here we go again; time to roll out the old policies and rhetoric'.

We all want stability in our lives—all of us, that is, except commodity traders. To revert to biology, steady state environments tend to produce species intolerant to the

stress of shocks. Since we cannot eliminate shocks, a little pre-conditioning from volatility might not be a bad thing. We should therefore expect and must learn to live with short-term volatility in commodity prices. It is the symptom of a market sorting its way through the sea of information and news that could affect supply and demand. What most concerns governments are the major and enduring increases or decreases in price. When prices fall they cause injurious losses of revenue that in turn cause serious socio-economic problems for developing oil-exporting countries. When they increase, they pose potential threats to the economies of the industrialized oil importing countries, but above all for the poor developing countries.

Market stability is apparently a universally advocated goal.

- The G8 leaders at Gleneagles on July 7th said, "Higher and more volatile oil prices are an issue of particular concern" and emphasised "the need for concrete actions to **reduce market volatility** through more comprehensive transparent and timely data."
- In its most recent press communiqué of Sept 20th OPEC referred to **'market stability'** six times.
- The IMF Finance Ministers similarly rallied to the cause in their recent communiqués: "The Committee emphasizes that oil producers, oil consumers, and oil companies will all have their part to play in working together to promote **greater stability in the oil market**"[11] and called for "improved dialogue between oil producers and consumers to promote greater oil market stability". This language merely builds on similar appeals made in 2002 at their meetings when they "underscored the importance of **stability in oil markets at prices** reasonable for consumers and producers"[12]. Betraying its asymmetrical concern about oil prices, in 1998/99 when oil prices had collapsed what worried the IMF was that low commodity prices would "decrease financial flows and delay adjustment" to the precepts offered by the 'Washington Consensus'

In reviewing these communiqués the world's international financial and energy/oil agencies concur on several central themes:

- The need for more investment, especially in refining;
- The critical importance of oil market information and transparency of data on supply and demand;
- The desirability of cooperation and dialogue between producers and consumers.
- Concern for poor, oil importing developing countries and their increased burden posed by higher energy prices.

Where does the energy industry stand? They are legally constrained in saying anything that could be interpreted as leading on what the price should be, however, some in the industry hint at the need for cooperation.

- For the last several months, David O'Reilly, the Chairman and CEO of Chevron, has been sending the world memos and notes in full page ads in the

[11] Communiqué of the International Monetary and Financial Committee of the Board of Governors of the International Monetary Fund, September 24th, Washington D.C.
[12] Communiqués of the International Monetary Fund, April 20, 2002 and repeated in September 28th, 2002, Washington D.C.

Economist, the *Financial Times* and other newspapers, reminding us that the era of easy oil is over, that "we can wait until a crisis forces us to do something, or we can commit to *working together*" (emphasis added).

- The UK industry has recently asked for clarity and stability in policy relating to how the government will achieve its climate goals. They are flagging a serious issue for investment—as long as there is uncertainty as to what governments might do, investment will be stalled; the longer they stall, the more likely the severity of the policies will increase as government perceives the problem as worsening; the greater the risk, the greater the uncertainty, and on and on through a vicious spiral.
- The appeals of Chevron contrast with those of ExxonMobil's CEO heir apparent, Rex Tillerson, who recently said, "Ours is a cyclical industry—what goes up will invariably come down and will undoubtedly go up again". He warned against taking long-term investment decisions on the basis of what he sees as short-term price movements[13]. This 'shotgun' message was implicitly directed at governments, consumers, employees, competitors and suppliers—'because prices will come down, don't do anything to appropriate any of the surplus rent thrown off by these prices'.

But what precisely is meant by 'market stability'? The last time we enjoyed what might be called stability in oil prices was in the fifties and sixties when the 'Seven Sisters' controlled supply and set the price. I doubt anybody is prepared to publicly advocate that model today. So how would Producer – Consumer Dialogue approach this goal?

The Producer – Consumer Dialogue: the Context

The 1990/91 crisis finally laid the ground for dialogue. A joint initiative by France and Venezuela led to the first meeting of ministers from oil exporting and importing countries, in Paris in July1991. Subsequently known as the International Energy Forum (IEF), Ministers and energy Experts' from producer and consumer countries have met on alternate years ever since; in 2000 Saudi Arabia offered to host in Riyadh a Secretariat for the Forum. The 10th IEF Ministerial meeting is scheduled for Doha in 2006. The secretariat is limited to technical activities such as conferences, seminars and information. The impetus for the JODI came from the IEF. The political dialogue remains the prerogative of Ministers.

Dialogue has proliferated to regional levels: EU/Gulf, EU/Russia, EU/OPEC, Gulf/Asia, and many more, even here in North America under the NAFTA Energy Working Group. These improve understanding, mutual respect and confidence. Thus there is no end of intergovernmental discussion and dialogue; this is healthy and to be encouraged.

For producers, the central goal is some assurance of steady revenues. Therefore at the end of the day, dialogue and cooperation must hope to conflate to *price* stability but at a price that assures producers sufficient revenues to meet their goals and obligations. This objective is manifestly in the interest of consumers because revenue volatility can potentially foster political instability in some producing countries. Price stability

[13] Commenting at the World Petroleum Congress in Johannesburg as reported in The Financial Times, September 25th, 2005.

is what OPEC attempts to achieve by adjusting the volume lever and does so based on its judgement of over-all demand and of supply from non-OPEC producers. But this has proven to be a chronically difficult thing for OPEC to do, mostly because judging future supply and demand is so fraught.

The importance of Information

The IEA's Monthly Oil Market Report is the recognized reference for analysts trying to follow world oil supply and demand balances. In its July issue each year, the Agency starts estimating demand and supply for the following calendar year. The IEA is not alone; others including OPEC develop and publish their own estimates. To understand OPEC's challenge in trying to determine ahead of time how much of its capacity will be needed, we only have to review the record of success in estimating two fundamental elements of the market: **Growth in World Oil Demand** and **Growth in Non-OPEC Supply**.

For 2003 and 2004 the IEA underestimated growth in world demand and over-estimated Non-OPEC/Ex FSU supply a year ahead by a combined net 3.5 mb/d and 4mb/d respectively. This is not a criticism. The IEA is in very good company. OPEC and the U.S. DOE/EIA and financial institutions, presumably all looking at the same mass of information, see vastly different futures. For example the range among their projections at any one time can vary by nearly 100%. That was the situation as of 14 October, 2005, when the projected growth in Non-OPEC Supply for 2006 over 2005 ranged from 0.72 to 1.32 mb/d. Figure 1 illustrates the maximums and minimums of moving projections since July 04 for World Demand for 2005 and since July 05 for 2006; Figure 2 shows the running projections for Non-OPEC Supply growth.

Figure 1: Moving Maximum and Minimum projections of **World Oil Demand Growth** for 2005 vs. 2004 and 2006 vs. 2005 (shaded) by Barclays Bank, International Energy Agency, OPEC and DOE/EIA (1,000 b/d).

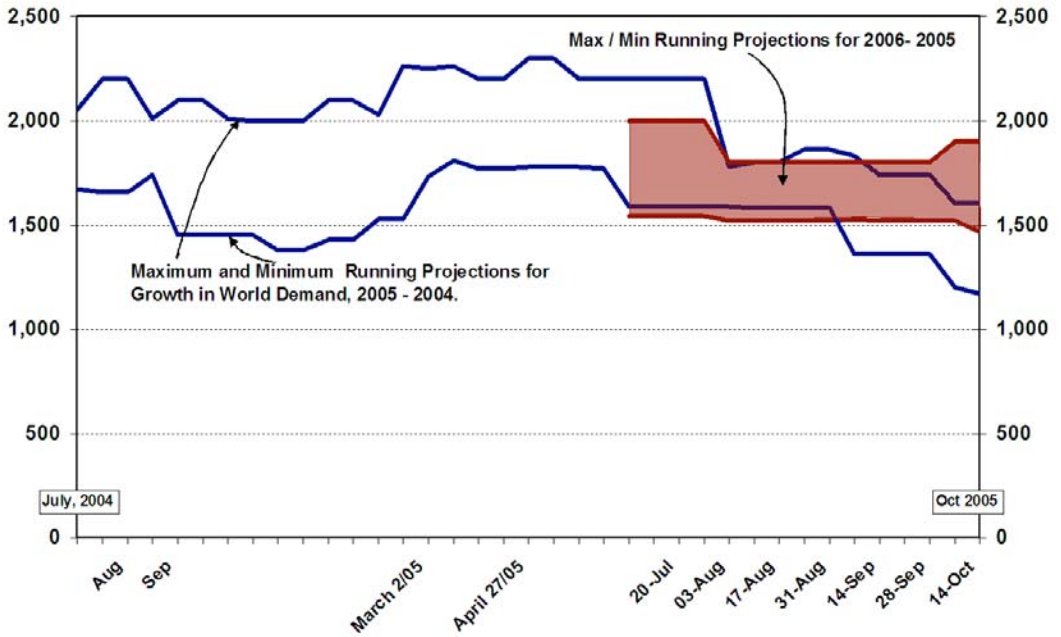
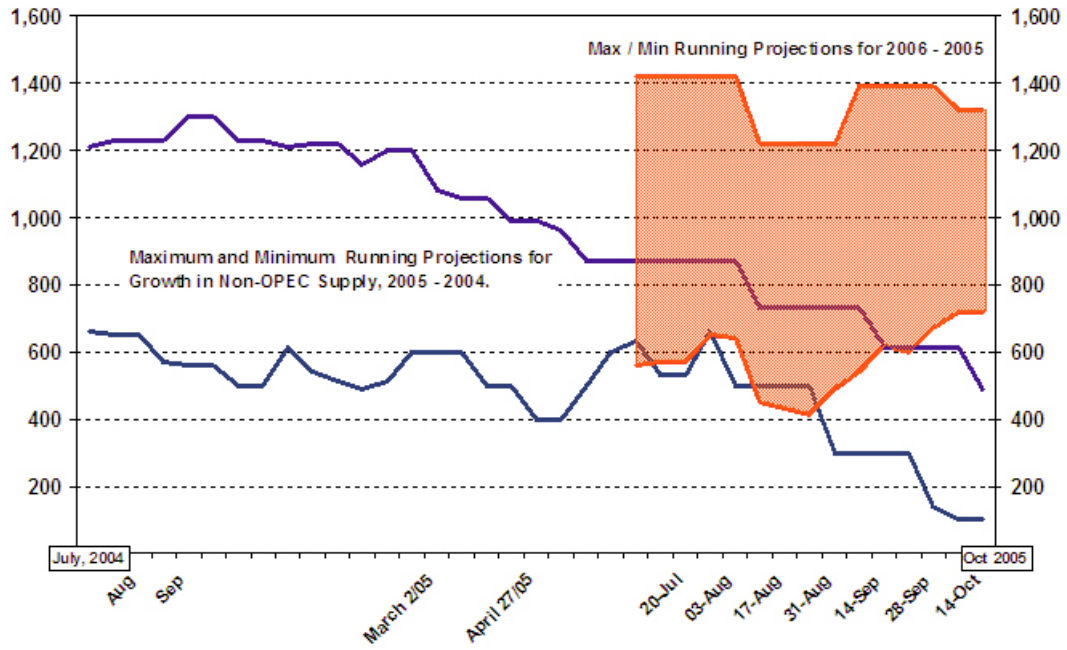


Figure 2: Maximum and Minimum moving projections of **Growth in Non-OPEC Supply** for 2005 vs. 2004 and 2006 vs. 2005 (shaded) by Barclays Bank, International Energy Agency, OPEC and DOE/EIA (1,000 b/d).



These figures illustrate the challenge OPEC faces in planning capacity needed to make up the difference between world demand and non-OPEC supply. Last year at this time OPEC would have had to ready anywhere from 1.54 to .87 mb/d incremental supply, the net of the max and min of projected growth in world demand and the growth in Non-OPEC supply. By April, 2005 the range was 1.66 to 1.2 mb/d. Today, it looks like anywhere from 1.5 to 1.11 mb/d. While estimates in the growth of demand have declined by over 0.6 mb/d, the projected growth in Non-OPEC supply have come down by an almost compensating amount. The Maximum projected call on OPEC for 2005 over the period ranged from 1.9 to 1.28 mb/d; the Minimum from 0.91 to 0.15 mb/d, yet the average of projected call today is not much higher than it was a year ago. This illustrates the noise in the planning envelope projected by different players analysing highly dynamic market information. The recent significant fall off in Non-OPEC supply is attributable to the hurricane-induced loss of US Gulf Coast production. Such things cannot be predicted.

It is one of the ironies of this post-Marxist/Leninist/Soviet/Maoist era that the two greatest sources of uncertainty in oil markets are Russian supply and Chinese demand. Another source of uncertainty is OPEC itself, which has to rely on secondary sources for estimates of production from its own members. So, better data and information are certainly the right starting point, with the caution as demonstrated above: data alone are of no value—it is how they are interpreted that counts.

So what can OPEC do? Member countries do not want to get caught again where they were in 1986 with over 10 mb/d of spare capacity. If they increase drilling and develop too much capacity they idle valuable capital that their governments can use elsewhere. Too little and they are blamed for forcing the price up, as UK Chancellor Gordon Brown implied in his remarks to the Trade Unions' Congress on September

13th, 2005[14]. Assuming dialogue improves market information and its understanding, what else could international cooperation do to increase 'market stability'?

Dialogue, but about what?

In order to understand what producer consumer dialogue might achieve, we need a better appreciation of who the parties are at the table and the issues and subjects they might want to put on an agenda. OPEC recently reiterated its position that **"dialogue must address all the issues of interest to all parties**"[15].

First of all, it should be understood for purposes of this discussion, 'producer' refers to oil export-dependent developing country and a 'consumer' is a country—both industrialized and developing—that must import oil to meet its energy needs but does not exclude net oil exporting/consumer countries like Canada, Denmark, Norway and the UK. It becomes readily apparent that an assortment of interests and strategies will array themselves along the 'consumer' side of the table just as there will be different interests among producers. It should not be overlooked that just as poor oil exporting countries have rich citizens who are further enriched by high oil prices, rich countries have poor citizens who are further impoverished by high oil prices.

Agendas have been suggested in the past[16], but has anyone made a comprehensive list of 'all the issues'? Here is a partial list of potential agenda items.

- **'Demand security'**; as vague as supply security, although the rationale for producers wanting steady and growing demand can certainly be understood both in socio-economic and in technical/operational terms. If importing countries want security of supply would they be prepared to sign 'take-or-pay' contracts to assure producers security of demand?
- **Downstream petroleum taxes**: A long-standing irritant among producers is the asymmetry of rent from oil, where consuming countries extract 2 or 3 times more revenue from taxes on petroleum products than producers receive from the feedstock crude.
- **Consumer country anti-oil policies**: Another irritant for producers are the 'off-oil' programmes, policies and taxes of consuming countries that discriminate against oil and erode demand security.
- **Downstream integration**: in the past, some attempts by OPEC national oil companies to integrate downstream into consumer countries were rebuffed but this would not seem to be a great concern today as countries such as Saudi Arabia, Kuwait and Venezuela have successfully established downstream operations in consuming countries; ARAMCO is currently developing a large petrochemical/refining complex in China. For increasingly heavy, sour grades of crude, it might make more sense for producers to capture the added value by upgrading and refining heavy crude at home and exporting the higher value products.
- **Strategic Petroleum Reserves and Stocks**: cooperation and consultation on when to fill and draw down government-managed oil stocks could serve as an additional volume lever in the market (consultation on their use has already

[14] See http://www.tnn.co.uk/CurrentIssue/plonearticle.2005-09-13
[15] See OPEC Communiqué of September 20, 2005.
[16] R. Mabro, 1991, *A Dialogue Between Oil Producers and Consumers: The Why and the How*, Oxford Institute for Energy Studies, SP2, available on www.oxfordenergy.org

taken place with clear recognition that spare production capacity should be used first).

- **Kyoto Protocol**: OPEC's position is that Kyoto will reduce their income from what it otherwise would have been and they therefore seek compensation from the industrialized countries. It is not clear what OPEC believes the price of oil and their revenues would be today had Kyoto not come into force, or how this calculation can ever be made to the satisfaction of all parties.
- **"Sharing the burden of spare capacity"**: Holding spare capacity is costly. It is well recognized that the OPEC spare capacity post-1986 was not the result of a conscious policy in OPEC. Burden sharing hinges on answering the question, 'Who benefits from spare capacity?' This does not easily lend an answer to the next question, 'Who should pay?' or more complicated, 'How?' While some non-OPEC producers have cooperated with OPEC in shutting in production during slack market periods, OPEC logically wants others to share in the costly burden of investing in spare capacity. Taken to its logical conclusion this would ultimately require coordination of investment among oil producing countries. But it seems inconceivable that a producing country would want to subordinate that decision, namely the sovereign control of the pace of development of its resources, to the outcome of cumbersome, politically charged intergovernmental negotiations. At a more benign level, OPEC has voiced its desire for greater investment transparency, but this is really a non-issue today: plans[17] are not a secret in nearly all producing countries outside OPEC[18], especially where private companies are involved as they are obliged to report their activities—the real problem is judging project delays and upsets. Cooperation from some OECD countries could pose problems if it requires modulating output: while pro-rationing of production was practised in the past in North America, this might contravene anti-trust legislation if it were done explicitly to increase prices (The flip-side seems acceptable however; namely, using the SPR to *reduce* prices). Also for production from integrated heavy oil and oil sands plants, offshore platforms, GTL plants, and operations in permafrost regions, there are technical reasons why shutting in production is not feasible. It has also been suggested[19] that consuming countries that produce oil could invest in spare capacity at home. Alternatively importing countries could finance spare capacity in producing countries, although this would be a hard sell politically and extraordinarily difficult to prorate contributions, although perhaps the budget formula used for membership in the IEA might serve as a base, but what about China and India? They might argue that they are developing capacity in producing countries through the foreign upstream operations of their national oil companies.
- **A Price Band**: Price is at the core of market/revenue stability. While there seemed to be tacit acceptance of the $22-$28/b band, is it reasonable to expect

[17] For example, the UK Energy Institute journal, *Petroleum Review* periodically publishes a list of all the major new projects by country with their design peak or platform production and expected year. The latest update appears in the October 2005 issue.

[18] The IMF recently called for "improved data on available excess capacity and *planned investment*—particularly for OPEC producers", (IMF World Economic Outlook, April 2005, p. 173, although all IMF staff need to is read MEES every week to get a reasonable idea of OPEC investment plans. Saudi Arabia, the most important player, has made their plans very clear over the last year.

[19] Nordine Aït Laoussine, *Oxford Energy Forum*, November, 2002.

there could be discussion and explicit international acceptance of a price band, given the high likelihood its legality[20] would be challenged in many OECD countries?

- **'Asian Premium/US Discount'**. Viewed by Asian importing countries as price discrimination, this issue was discussed in the regional dialogue or 'Asian Round Table Dialogue' between oil and gas exporting countries and Asian importers in New Delhi on January 6, 2005.
- **Other trade-related issues.** Dual pricing (gas pricing in Russia? LPG feedstock export/domestic pricing policies of Middle East producers?); US import restrictions on ethanol derived from sugar? US Superfund taxes on imported petroleum.
- **'Reserves transparency'**: some consuming countries[21] and the IMF staff[22] advocate "better reporting and monitoring of oil reserves, production, and consumption by individual countries." Besides being offensive to some producer governments, it is not clear why this is advanced and what it would achieve. Reserves relate to price trends over decades, whereas the concern with 'market stability' is short term. Is the motive behind 'reserves transparency' to mirror at the global level what the SEC does at a much more micro and commercial level—assure investors (consumers) that oil companies (countries) have what they say they have? If so, since when have international bodies assumed this mantle of oversight on something as fundamental as a nation's sovereignty over its resources? This subject fosters suspicion of hidden agendas and therefore holds much potential to cause misunderstandings.
- **'Access'**: Another loaded subject and perhaps linked to 'reserves transparency', the subject of access to resources is usually advanced by countries and their institutions serving as proxies for oil companies wanting access to the 'easy oil reserves' of the Middle East in particular but also of Mexico (not so easy). The reality is that Saudi Arabia in particular does not need the major oil companies' assistance and it is difficult to demonstrate how host countries would receive more revenues from foreign companies than they would from their state-owned companies. Most oil producing countries already allow access, but the terms are not acceptable to the shareholders. In the current price environment, terms are not likely to be improved. Finally, the issue of 'access' cuts both ways—vast areas of the United States (and parts of Canada) are not open to oil and gas exploration so it would be disingenuous of the U.S. to put this issue on the agenda.
- **Aid to poor developing countries** facing ruinous oil import bills. Three quarters of developing countries do not pass through to consumers the full cost of imported oil. Would removing these subsidies be a condition to receiving assistance?
- **Political issues** such as **Palestine/Israel**? Some countries see resolution of this issue as crucial to closer ties between Middle East producers and western

---

[20] There have been at least two unsuccessful attempts by groups or individuals to pursue OPEC in US courts for price fixing.

[21] *Ibid*; Gordon Brown's Five Point Action Plan called for OPEC to increase oil supply, OPEC to open books to show reserves, Windfall from high prices to be diverted to funding new production, a new World Bank Fund to help developing countries invest in alternatives, and a new IMF facility to support poor countries hit by shocks in oil and commodity markets.

[22] IMF World Economic Report, April 2005, Chapter IV, p 173

consuming countries. **Iran and the Nuclear issue**: how about a 'nuclear free Middle East'?

The list of possible issues is long and rife with potential to cause tensions because it mixes economic/financial, technical and political matters. A fundamental barrier to pursuing intergovernmental exporter/importer mechanisms is the asymmetry in agents actually engaged in exporting and importing activities: producer countries work largely through state-owned entities, whereas importing countries rely on private oil companies. Thus on one side of the dialogue table are government representatives with direct leverage over their state-owned companies. On the other side of the table, are officials who have no influence or even any legal basis for instructing companies on importing or production strategies and operations. This makes it very difficult to revert, for example, to state-to-state oil importing arrangements such as pursued in the seventies although John Mitchell of Chatham House in an excellent review[23] of the subject of dialogue, has pointed to the largely state-managed oil trade East of Suez, perhaps predisposing oil trade in that region to government to government arrangements. But they would still be linked to world prices set in the Atlantic Basin market.

To illustrate the difficulty of discerning what dialogue might do to reduce price volatility, we could ask ourselves what producers and consumers might have done to have prevented the commodity price collapse of 1998 and the recent tripling of oil prices. These two recent major price swings grew out of complex and much larger sets of events and forces far beyond the oil market. If the 1998 price collapse was in part caused by internal discord on quotas in OPEC, it is hard to see what dialogue with consumers would have achieved. However, dialogue with non-OPEC *producers* is another matter and in the end it probably did contribute to pulling the price back up from $10, ultimately aiding 'free-riders' such as Canadian, UK and American producers.

Geopolitics has helped to get prices to where they are today. And higher prices are changing the geopolitical context of energy in many ways as the advantage and the power of choice shifts from consumers to producers in tight energy markets. As noted, the major loci of incremental demand and non-OPEC supply have shifted to China and Russia, increasing uncertainty, realigning trade, investment and bringing new political and security factors to bear. The OECD/IEA countries as an oil consuming/importing' block is no longer relevant: China and India are and they must be included in the IEA's coordinated emergency response system. Europe's concern about energy security seems to be focussed on the growing dependence on Russian gas. Russia might be concerned about Europe's anaemic growth not offering much up-side for its gas exports. Russia under President Putin is showing that oil and gas resources are a trump card that has some potency in a producer's market. Japan and other Asian countries are deeply troubled by the energy elements of China's foreign policy. Chinese and other Asian national oil companies (NOCs) are actively pursuing projects in the upstream of other countries, including here in Canada. Those producing countries that opened to foreign companies may now be less dependent on foreign investment. Thus the geopolitical map of oil and gas trade flows and tensions

[23] J. Mitchell, 2005, *Producer – Consumer Dialogue: What Can Energy Ministers Say to Each Other?* Paper in press.

is changing. This does not mean that Dialogue is not needed, but that the weight, influence, agendas and expectations of players around the table might not be what they seemed only a decade ago, thus it aims to hit a moving and diaphanous target.

The principal issue today is manifestly not inadequate crude oil supply, but rather price. The concern before governments of importing countries is higher prices than two years ago and the prospect of even higher prices. The question then becomes, if we cannot manage volatility out of the system, can we manage its consequences? In other words, if prevention is not possible are there palatable cures for its effects? Some possible mechanisms that could alleviate the pain of volatility include:

- **Oil Funds**: some oil producing governments (e.g. Abu Dhabi, Alaska, Alberta, Norway, Kuwait, Nigeria, Venezuela) have established 'rainy day' funds or funds for when the oil runs out (two different propositions). These have had mixed success and longevity. But given that price volatility is inevitable, all producing governments should consider establishing some kind of set aside fund to help address fluctuations in revenues. In effect some producers are currently addressing the issue by paying down debt, building reserves, and not making the same mistakes of the seventies and eighties by over-investing.
- **Rebates and Payments to the poor and dependent**: An argument can be made in favour of temporary payments to poor households. Consuming governments' fiscal revenues increase with higher oil prices; it is therefore reasonable that some of this could flow back to the specially affected. A serious drawback of these payments is that as with all subsidies, they are easy to start but extremely difficult to terminate.
- **Reduce consumer taxes**: Consuming governments could alleviate the price effect by reducing their taxes on oil products but would be counter-productive in a tight market, and would be difficult to reconcile with other policies not the least of which are reducing environmental and social/health impacts of the transportation sector and balance of payments.
- **Poor country fund**: Is it conceivable that the IMF or World Bank could set up a contingency fund to assist poor countries manage the impact of higher oil prices when most of these countries do not have any plan to increase the flow-through of higher prices to consumers? Would an insurance mechanism[24] be possible for single commodity economies?

If we want to fix something, we need to understand what we are fixing. It is generally accepted that it is primarily the lack of investment throughout the supply chain over the last two decades that created the conditions leading to a tight market. Governments policies should match the problem.[25]

The Investment Problem

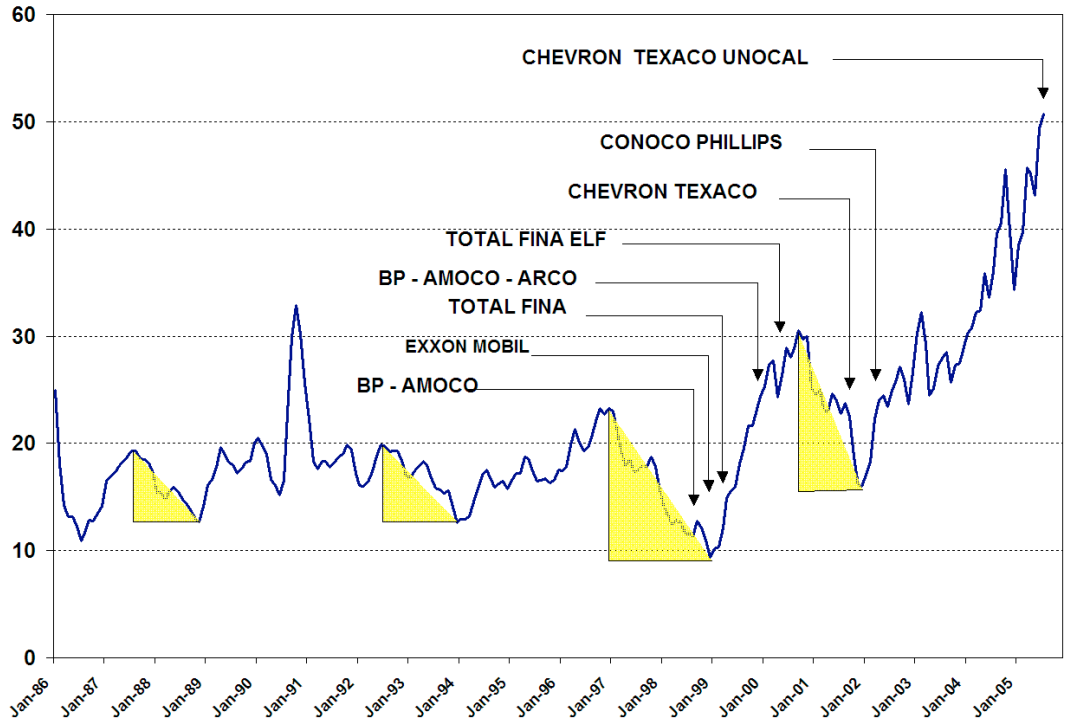
After the oil price collapse of 1985/86 there were four false starts for a price rebound but each time it slid back down to a base between $10 and $16 (Figure 3). This discouraged investment as firms hardened their hurdle rates around $16/bbl. At first, companies turned to cutting costs through layoffs (including explorationists),

[24] For example, see J Bower and N. Kamel, 2003, *"Commodity Price Insurance: A Keynesian Idea Revisited"*, available on www.oxfordenergy.org

[25] J. Mitchell, 2005, *"Energy Policy: Old Baggage",* Oxford Energy Forum, Issue 60, February 2005

outsourcing and selling off non-core assets and businesses[26]. After exhausting that source of returns to shareholders, companies pursued growth through mega-mergers and acquisitions. The European power and gas sector is also noteworthy in this regard. But the oil industry saw 5 super-majors emerge from at least 17 smaller firms.

Figure 3: US Average Refiner Acquisition cost highlighting the price drops through the late eighties and nineties that kept investment hurdle rates at $16/bbl or less, drove cost cutting and eventually led to the 'merge/buy to grow' flurry of the late nineties early 2000s. The largest mergers among the major oil companies are shown. (Source: US DOE/EIA, company websites) Vertical Axis $/bbl



This structural change poses both optimism and uncertainty for investment. First of all, their size now enables these super majors to invest in large capital projects that before would have exceeded their tolerance for single project risk. For example, it would have been unheard of a decade ago for a company to launch an LNG project without first securing buyers for all the output; major integrated unconventional oil projects are now manageable within a single firm's risk tolerance. Large firms bring to bear their R&D capacity and technical skills on these new difficult sources of hydrocarbons.

On the other hand, to some extent these companies have outsized themselves for most mature conventional hydrocarbon provinces. They do not have access to some of the largest and lowest cost reserves in the world, or at least under terms that meet their shareholders' expectations. Where they do have access, the size of the prospects is often too small to meet their materiality threshold. This partly explains the recent stepped up interest among large companies in unconventional liquids as they can contribute significantly to these companies' production base.

[26] See for example, Nick Antil & Robert Arnott, 2003; *"Oil Company Crisis: Managing Structure, Profitability and Growth"*, Oxford Institute for Energy Studies (available as SP 15 on www.oxfordenergy.org

Their size also attracts unwanted attention. 'Big Oil', the pejorative pretext for anti-industry and confiscatory polices in the early seventies, is reappearing. Headlines of the mountains of cash currently flowing back to their shareholders in the form of share buy-backs and dividends attract envy and misinterpretation. Compared to 2000, the five super majors' net post-tax cash from operations in 2005 is estimated to have increased by some $65 billion or 80%. Of that, more than a third will go back to shareholders as dividends and share buybacks, $10 Billion to pay down debt and $20 billion will be reinvested. Politicians, who live in a very short-term cycle, hastily and incorrectly conclude that these companies are not interested in investing in more supply. They therefore want a greater share of the windfall rent. But the industry would be severely challenged trying to re-invest all their cashflow, not the least owing to the lack of skilled people and capacity in EPC and equipment suppliers. They have many projects on the drawing board but do not have sufficient skilled persons to implement them, and in any case they must exercise discipline in assigning capital among projects. Energy projects are large fixed capital investments that take years to plan, design, order and build. It is a totally unreasonable proposition that cash flow in such a cyclical volatile industry based on long lead time projects should be perfectly and proportionately mirrored in investment.

But this does not mean that some governments will not seek a greater share of the oil rent and/or raise barriers to entry by foreigners. We have seen recent examples in Bolivia, Kazakhstan, Russia and Venezuela. On the other hand, Algeria is becoming more open to outside investors in the upstream. Experience in the past should remind us that when governments hint at tightening rent regimes the effect is to reinforce the problem they are trying to address—lack of investment.

The 2000 California energy crisis, the major power blackout in eastern North America in 2003 and the catastrophic breach of the levees in New Orleans had in common a history of weak investment. In each case the regulatory framework was not sufficiently robust or explicit to encourage investment. Most governments must confront the paralysis in decision-making for building and improving energy infrastructure. This applies throughout the energy supply chains: to new pipelines, refineries and upgrading capacity, LNG regasification terminals, electricity infrastructure and mass transit systems. With public resistance to LNG terminals on the east and west coasts of America, their default location will be in hurricane country, along the USGC where local populations are accustomed to oil and gas infrastructure.

The world will have to get accustomed to volatility in energy prices as long as spare capacity along the supply chain is so tight. Volatility is likely to increase in both frequency and in magnitude. Large and growing shares of the world's oil and natural gas pass through strategic chokepoints such as international straits and large diameter pipelines through politically unstable countries. Furthermore, new oil and gas supply will come from large, single installations, including offshore platforms, complex integrated unconventional oil plants, major refineries, and LNG plants and terminals—all prone to accidents and upsets. As long as spare capacity is thin along or at any point in the supply chain, upsets in such a 'lumpy' system will tend to generate price spikes. And even when adequate spare capacity is restored, most future supply will come on stream in significant lumps, with the potential to cause

downward price spikes if not monitored carefully and accommodated in the supply system.

In many ways, the global oil supply system has come to resemble the North American natural gas system: ample resources and reserves, but the only relevant factor is gas deliverability and that is a function of drilling, connections, processing and transportation infrastructure and storage capacity and now it includes the availability of LNG regasification terminals and take-away capacity. Public Utility Commissions are beginning to worry about security of gas supply and are seeking proof that local distribution companies are doing enough in that regard. Perhaps there is a lesson here for consumers to look after what they can look after? Unless there is spare capacity—unimpeded deliverability—along the oil chain from the wellhead to the consumer, we face greater probability of price volatility. While liberalized gas market structures can reward storage and swing capacity, they do not easily reward the carrying of strategic oil inventories or spare oil production capacity[27].

Is there a role for governments? As discussed above, it is difficult to imagine a multilateral forum allocating investment under some burden-sharing regime to manage the orderly development of 'just-in-time' capacity in the oil and gas chain. It is not done among OPEC members, so it is unimaginable in a larger more disparate group of producers and consumer/producer countries. In essence it would require a centrally planned system that would assign new production projects to a merit order according to a multitude of presumably negotiated socio-economic and technical criteria. This would not address market volatility. The last thing the world needs is for governments to drift back into the woolly-headed business of directing investment, above all at the international level.[28] The record of government intervention in supply management is not glorious even at the national level (there are exceptions[29]), let alone internationally (recalling the attempts in the seventies to develop international commodity agreements as part of the 'North-South Dialogue'). Any formal signal that governments were headed back in this direction would have the exact opposite results: it would create uncertainty and therefore stall investment until the new rules of the game were known. This would be folly.

Governments have had an easy ride of it during the years of energy capacity surplus. Relying on markets and embracing proxy energy policies like climate change response measures met little resistance in most countries. Governments' laissez faire attitude essentially amounted to an abdication of energy policy leaving governance of the energy sector largely to non-elected, unaccountable non-governmental organizations and special lobbies promoting marginal new sources of energy.

---

[27] John Mitchell, 2005, *ibid*

[28] The European Energy Charter Treaty proposed by Rudd Lubbers while Prime Minister of the Netherlands referred to 'concessions' several times in the original communiqué. The Charter could have stuck to the essential requirement of developing an international regime governing transit pipelines, but betraying the real intent implied by the reference to 'concessions', the treaty became a multilateral investment regime. Russia has refused to ratify it, has recently restricted foreign investment in Russian sub-surface resources and is now building a pipeline across the Baltic Sea expressly to avoid the transit problems that the charter was supposed to address in the first place.

[29] The fiscal regimes deployed by Venezuela for the ultra heavy oil in the Orinoco Faja and by Alberta and Canada for the Alberta Oil Sands are notable exceptions of government action to increase supply, although both have been criticized as too generous. Venezuela has changed its fiscal regime for the Orinoco.

Governments bought the argument that efficiency gains would allow them to ignore or put off decisions to increase supply from the traditional fuel sectors[30] that provide nearly 90% of the world's primary energy. Because new supply projects in these sectors have planning or gestation periods exceeding the life of several parliaments, successive governments could skirt by without having to make potentially unpopular decisions on their 'watch'.

The liberalized market policy model is now under pressure: like most policies, it is only as durable as citizens' contentment with its consequences. So governments face tough decisions but need to be very careful in how they respond to consumers. They must avoid approaching the challenge with a Maginot mentality. Governments need to be clear on what the 'threat' is this time round. It may well be bad policy. Few politicians would have the courage and conviction to simply say that high prices are a fact of life, here to stay and consumers must learn to live with them. But it would be bad energy policy, bad environmental policy and bad fiscal policy to try to shelter consumers from these prices. In these circumstances, targeted short-term 'life-line' assistance to the energy poor, while cumbersome, inelegant and difficult to terminate, is better than reverting back to the failed policy menus of the seventies.

Conclusion

At a global level the volatility in prices we are experiencing today does not stem from inadequate resources. Nor is it because governments have failed to talk to one another: that they have done and must continue, if only to improve understanding of the challenges each faces. For producing countries, the burgeoning demand for oil in China and India must be redefining their traditional preoccupation with 'security of demand'. For OECD governments preoccupied with 'security of supply', if they want to help reduce the risk of price swings, they need to ensure the links are working in the energy supply and demand chain within their own jurisdictions. For example, rather than exhorting[31] China to use energy more efficiently or haranguing OPEC countries to allow oil companies access to their resources, the G8 countries might ask whether they have done all they can at home to assure transparent, non-discriminatory access to resources and markets, attractive investment conditions and stable, clear and effective regulatory regimes, and whether they can improve transparency of their energy markets? Finally for some countries are prices sending the right signals to consumers?

Two fundamentals make markets work: information and choice. If governments are concerned about volatile markets and believe that uncertainty contributes to volatility they need to ask how much that uncertainty is due to poor information and its misinterpretation and how much is due to poor policy or the *risk* of poor policy. Certainly all governments need to take JODI seriously and ensure that oil market data from their countries are comprehensive, of high quality and timely. But information by itself is not enough—it has to be interpreted correctly. Information enables wise choices. Choice is another word for diversity, the central determinant of energy security. Flexibility is diversity's operational complement; the test of a sound policy is how well it promotes flexibility for industry and consumers alike.

---

[30] Coal, oil, natural gas, nuclear and hydro (in 2002 these comprised 89% of World primary energy and 96% of Canada and US primary energy; IEA WEO, 2004)

[31] *"It's in our economic interest and our national interest to help countries like India and China become more efficient users of oil."* (President Bush, 2005)